

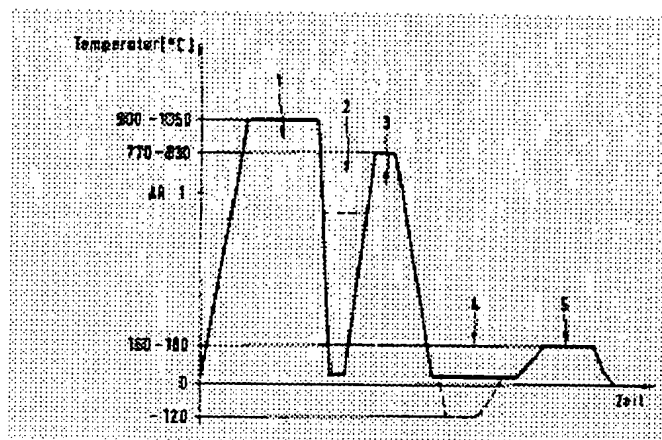
# Thermochemical-thermal treatment of case hardening steels - with deep cooling between hardening and tempering

**Patent number:** DE4204982  
**Publication date:** 1993-08-26  
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**Classification:**  
- **international:** C21D1/18; C21D1/78; C21D6/04; C23C8/22; C23C8/32; C21D1/18; C21D1/78; C21D6/04; C23C8/06; C23C8/08; (IPC1-7): C21D1/18; C23C8/22; C23C8/32  
- **European:** C21D1/18; C21D1/78; C21D6/04; C23C8/22; C23C8/32  
**Application number:** DE19924204982 19920219  
**Priority number(s):** DE19924204982 19920219

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## Abstract of DE4204982

Thermochemical-thermal treatment of case hardening steels comprise the following steps. Case hardening or carbo-nitriding (1) takes place at 900 to 1950 deg.C. This is followed by quenching (2) down to a temp. below the Ar1 point at a rate chosen to avoid cementite precipitation at grain boundaries. The subsequent hardening process (3) involves heating at a rate from 20 to 80 deg.C/min and holding at 770 to 830 deg.C for 5 to 15 min. The treatment is concluded by tempering (5). Deep cooling (5) down to -70 to 120 deg.C is foreseen between the hardening (4) and tempering (6) processes. The structure in the boundary zone has finely dispersed inter-crystalline carbide precipitations, with an area greater than 8 per cent of the total and a grain size finer than 10 according to ASTM E112. USE/ADVANTAGE - For mfr. of components of internal combustion engines. Improves the wear resistance of severely loaded components also



under unfavourable lubricating  
conditions.

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